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Electronic Devices in Telephony

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FIRST OF A SERIES of articles on electronics and electronic devices used in telephone work, written in a simple and readily understood manner. Part I presents the basic electronic principles

IT IS GENERALLY conceded that the telephone industry is a leader in adapting the new developments of science to its communication systems. In the development of a better, a more economical, and a more universal service, the telephone industry is continually watching and furthering scientific research. The splendid communication facilities available today prove the wisdom of this policy.

Less than 25 years ago the vacuum tube was adapted by telephone engineers to the problem of amplifying the weakened speech currents at various points along the line. These amplifiers, or repeaters, made transcontinental telephony a commercial possibility. This was, it appears, the first major commercial use of electronic equipment. Because such applications have rapidly extended, a better knowledge of electronics and of electronic devices is desired by many telephone men. This series of articles will provide this information in a simple and readily understood manner.

There are good reasons for believing that all electrical phenomena, including current flow, are electronic in nature. Electronic phenomena are usually considered, however, as those which are best explained by considering the discrete or particle nature of electricity. Often, the usage is further limited to electrical phenomena occurring in gases or in a vacuum. In this article, and in those to follow, the word "electronics" will be taken to cover all phenomena in which the particle nature of electricity must be considered.

What Is the Electron?

The answer to the question, "What is the electron?" is simple. No one knows *exactly* what an electron is, just as the *exact* nature of space, or time, or of life itself is a mystery. But for scientific and engineering purposes much is known about electrons; so much, in fact, that electronics is quite an exact science. It is not necessary to know exactly what an electron is—if it is anything at all, in a material sense. In fact, what is called an electron appears at times to have the properties of a particle, and at other times to have the properties of a wave!

But for most engineering purposes it is considered that an electron is an ultimate indivisible particle, that its size approaches the infinitesimal, that its mass under most conditions is very small, and that it is electrically charged with 1.592×10^{-19} coulomb of negative electricity.

For building up the theory of engineering electronics, this description is the foundation. There appear to be other elementary particles, to be sure, but these have not as yet been fitted into the engineering picture.

The Production of Electrons

In the strictest sense, electrons are not produced at all; they are already present in apparently unlimited numbers in all substances. The problem in most electronic devices is, therefore, not one of producing electrons, but one of liberating them. Although there are other methods, there are two very important ways in which electrons are liberated from solids such as metals:

First, metals which are heated to a high temperature readily liberate electrons; and this principle is utilized in the conventional thermionic vacuum tube. Second, electrons are emitted from a metal when light is directed against the surface of the metal. This principle is employed in light-sensitive phototubes.

There is certain evidence that these two processes of liberating electrons are fundamentally the same. From an engineering standpoint, however, the important fact is that electrons are liberated by heating a metal or by directing light against it. After the electrons are liberated into the vacuum or gas they are free to be acted upon by external electrical forces and to execute the phenomena associated with vacuum-tube equipment.

Forces Acting on Electrons

The electron has the characteristics of a negatively-charged particle. If electrons are caused to travel from one point to another they carry electrical charges. Electrical charges in motion are in reality a current flow; hence, electrons in motion constitute a current flow. When current flows in a copper wire, it is thought to consist of a migration of electrons

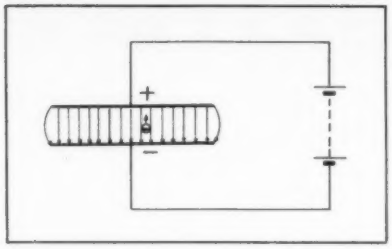


Fig. 1. The voltage impressed between the two parallel plates establishes an electric field of force which will cause the negative electron shown to move in the direction indicated.

from the *negative* to the *positive* conductor.

Thus, conventionally, a current of electricity is regarded as flowing in the incorrect direction because if a current of electricity is composed of negative electrons in motion, then they must move from the negative to the positive terminal. This causes no trouble, however, because the word *current* may be used to describe the conventional current considered as flowing from positive to negative, and the words *electron current* used when speaking of electron flow.

It is generally known that a wire carrying a current in a magnetic field is deflected, this principle being made of use in the electric motor and in other electrical apparatus. This current is thought to be a flow of electrons. Thus, if an electron is in motion in a vacuum tube, and if this tube is immersed in a magnetic field, the electron will be deflected. If a stream of electrons is passing through the tube, the stream will be deflected.

Although this principle is made use of in much electronic equipment, its relative unimportance in telephony renders its further consideration unnecessary.

Of great importance, however, is the control of the motion of electrons by electric fields. Because electric fields are less generally understood than magnetic fields, they will be briefly considered.

Thus, suppose that two parallel metal plates are connected to a source of constant voltage as indicated in Fig. 1. Also, assume that a free electron is situated between these two charged metal plates. The negative electron will be repelled by the negatively-charged plate and will be attracted by the positively-charged plate, and will move in the direction indicated by the arrow.

If the electron moves, a force has acted upon it. For this reason *electric lines of force* are pictured (Fig. 1) as existing between the two charged plates as indicated by the arrows extending between them. The direction of the line at each point indicates the direction of the force acting, and the number of the lines is a measure of the intensity of the field at each point. The motion of an electron at any point will be along the line of force at that point.

Electric fields in vacuum tubes caused by voltages impressed on metal electrodes (the plate and grids) are of great importance. The motions of the electrons in the vacuum tube, and hence the operation of these tubes, is controlled by the voltages impressed on the metal elec-

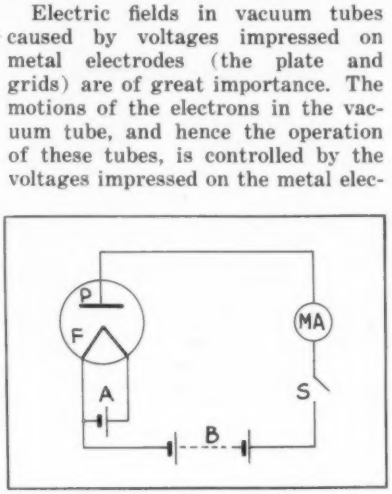


Fig. 2. Elementary vacuum-tube circuit. The filament F is heated by battery A. The emitted electrons are attracted to the plate P by the voltage supplied by battery B. The electron current flow is measured by the milliammeter MA.

trodes through the action of the electric fields (that is, the lines of force) which these voltages produce.

The Space Charge Effect

Suppose that an elementary vacuum tube is arranged with a wire filament, *F*, and a metal plate, *P*, as shown in Fig. 2. The filament is heated by the battery at *A*, and the filament emits electrons into the vacuum. If the switch is open, and if no charge exists on the plate, it will not draw the liberated electrons from the vicinity of the filament.

These negative electrons will accumulate in a negative "cloud" about the filament, and will constitute a strong negative charge in the space between the filament and plate. This negative space charge will produce a region which is negative with respect to the filament, and an electric field (Fig. 1) will exist between the negative electrons in the space charge and the filament.

The effect of this negative field of electric forces is that the negative electrons being emitted by the filament are now repelled by the negative space charge region about the filament due to the effect of the electrons which were previously emitted and which accumulated there because there was no where else for them to go.

The Action of the Positive Plate

If the switch in Fig. 2 is closed, a place is provided to which the electrons will go. The action is essentially as follows: Closing the switch connects the plate of the tube to the positive terminal of the battery, and the plate is now made positive with respect to the filament.

There is, therefore, a tendency to establish a positive electric field between the plate and the filament. But, the negative space charge has already established a negative field between the space charge region and the filament. Hence, in this region the actual field existing is the resultant field due to the effect of the negative space charge and the positive plate.

These relations are depicted in Fig. 3, which shows the potential distribution between the filament and the plate. Using the filament as a reference point, and measuring the potential or voltage at various points between the filament and plate, a negative potential is first encountered; and after the peak of the space charge is passed, the potential

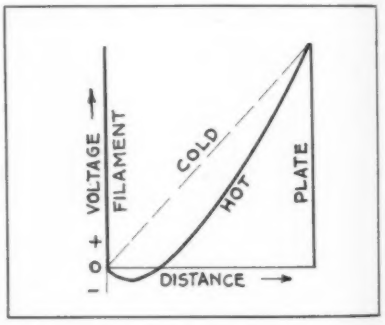


Fig. 3. Showing the voltage distribution between the filament and plate with the filament cold and hot. The negative voltage with the filament hot is caused by the space charge.

finally becomes positive with respect to the filament. If the filament is cold, the potential is always positive as the broken curve shows.

The practical importance of this is that the liberated electrons "hover" very close to the filament and cause a negative charge in the space. This charge repels other electrons as they tend to leave the filament. The positive plate voltage reaches into this space charge region and attracts some of the negative electrons to the plate. They then flow on around the circuit and cause an indication on the milliammeter.

The battery must do work in over-

coming the effect of the space charge; otherwise, there is nothing in a perfect vacuum, and hence no energy would be required to cause a current flow through the tube itself.

Although Fig. 3 would indicate that the space charge is some distance from the filament, actually it is a thin negative sheath quite close to it. That is, the maximum concentration is quite close to the filament in the ordinary tube under the usual conditions of operation.

To be strictly true, even the electrons flowing to the plate exert a repelling force on other electrons, and hence a space-charge effect can be considered as existing throughout the tube. But from a practical standpoint and in the usual amplifying type tubes, the space charge should be thought of as a thin negative sheath close to the filament, and through which the electrons must flow to reach the plate.

Effect of Gas in a Vacuum Tube

How can a tube be a vacuum tube if it contains gas? The answer is that no vacuum is perfect. Another reason is that in constructing certain tubes (gaseous rectified tubes for example), they are first evacuated to a high degree and then a *very small* amount of an inert (very stable chemically) gas is introduced. The presence of this gas changes greatly the nature of the electronic phenomena of the tube.

Before discussing the theory of gas tubes, it is necessary to examine an atom of gas. Of course, the structure of the atom depends on the type of gas, but the general structure is as follows: A gas atom may be thought of as consisting of a central portion called the *nucleus*, with one or more electrons revolving about it. The nucleus is positively charged,

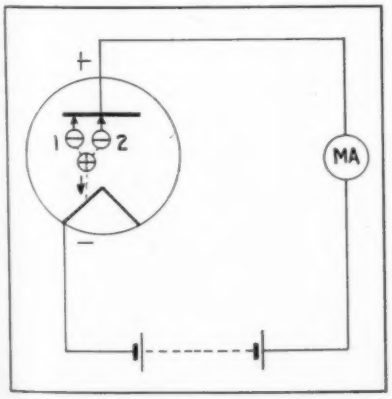


Fig. 4. Illustrating ionization by collision. Electron 1 in passing to the plate encountered a neutral gas atom and ionized it. As a result of the encounter, a negative ion (electron 2) and the positive ion were produced.

AN IMPORTANT SERIES OF ARTICLES

In recent years, the vacuum tube has been introduced into telephone equipment and its uses are rapidly expanding. Because of the wide application of this device for telephone purposes, many telephone men engaged in equipment and maintenance work desire a greater knowledge of the principles and operation of various electronic devices.

The first of a series of six articles, entitled "Electronic Devices in Telephony," appears on these pages. It is written by Arthur L. Albert, professor of communication engineering, Oregon State College, whose recent book, "Electronics and Vacuum Tubes," is the first to cover the subject as to telephone applications of vacuum tubes as well as to radio.

Written in a clear and concise style, this series of articles will be welcomed because of its timeliness in presenting, simply and understandably, material upon the increasingly important subject of electronics and electronic devices used in telephony.

PROF. ARTHUR L. ALBERT has had practical experience in telephone engineering work, as well as 15 years of experience in teaching various branches of telephone and electrical engineering. His various books and other writings have established him as one of the foremost writers of student technical literature of the present time.

the amount being equal to the number of revolving negative electrons.

It may be thought that since the nucleus is positive and the revolving electrons are negative, an electric force tends to pull them together, but that the centrifugal force due to the rotation holds them apart. Hence, the electron revolves about the nucleus and nothing happens. Since it contains equal positive and negative charges, the atom as a whole has zero resultant charge; that is, it is neutral.

But, when conditions are just right, and the gas atom properly receives energy from an external source, plenty happens to the gas atom. Thus, suppose that the tube of Fig. 2 contains a small amount of gas, and that the plate is made positive. As was previously mentioned, the negative electrons liberated by the filament have but little mass. Hence, as they are attached to the plate, they acquire large velocities.

Now, if everything is favorable, when one of these rapidly-moving electrons "strikes" a gas atom, it may impart energy to the gas atom, and cause it to lose an electron. Stated in simpler terms, a rapidly-moving electron on its way to the positive plate may "strike" (quotation marks are used with the word strike, because an actual physical encounter in the usual sense of the word is not necessary) a gas atom and knock a negatively-charged electron out of atom.

If this is done, the gas atom remains essentially a gas atom, but since it has lost a negative electron, it is now positively charged. Negatively-charged particles are usually called *negative ions*, and positive particles are termed *positive ions*.

The Action of Ions

Thus, if an evacuated tube has a small amount of an inert gas in it, and if the filament is heated, the electrons passing to the positive plate may reach a velocity sufficiently high that if they strike a gas atom they may ionize it by collision, and produce from the neutral atom a positive and a negative ion. The negative ion is the small, very mobile electron; but the positive ion is essentially a gas atom. Although its positive charge is numerically equal to the negative charge on the electron, it is quite massive compared with the electron.

The action just explained is illustrated in Fig. 4. Electron number 1 in passing to the plate struck a neutral gas atom, and ionized it by knocking out negative electron number 2. These two electrons now proceed toward the positive plate. Each may produce additional ionization by collision if they attain sufficient ve-

locity and if they happen to strike a gas atom under proper conditions. Thus, the effect of ionization is cumulative.

The massive positive ion will now move toward the negative filament, but its mass prevents it from reaching a velocity comparable to that which an electron would attain under the same electric field or voltage conditions. Since the electrons have little mass, they are quickly withdrawn to the plate, leaving a preponderance of the massive positive ions in certain parts of the tube. This action is of very great importance.

Space Charge Neutralization

As these massive, slowly-moving, positive ions gradually approach the negative filament, they encounter the region where the negative space charge would otherwise exist. These positive ions are largely able to neutralize the effects of this negative space charge caused by the electrons liberated by the hot filament. As a result, in a gas tube a high *negative space charge does not exist* around the filament as it does in a high vacuum tube.

The importance of this is that in a gas tube a low plate voltage is sufficient to draw a large plate current through the tube, but in a high-vacuum tube the effect of the negative space charge is to necessitate the use of a much higher plate voltage for drawing the same (or less) plate current. In other words, the gas tube may be regarded as a low-resistance device with a corresponding low internal voltage drop, but the high-vacuum tube with its space charge has high internal resistance and a correspondingly high internal voltage drop.

The incorrect statement is often made that the importance of the gas is to supply additional electrons by ionization by collision. Of course, it does, but this is beside the point, because there are already *plenty* of electrons available in the space-charge region.

The importance of the gas, and of ionization by collision, is that the resulting massive positive ions linger in the tube and accumulate near the filament after the rapidly-moving electrons produced by the ionization have darted away, and these remaining positive ions neutralize the space charge. Large currents can then be drawn to the positive plate with a low internal voltage drop.

The word "plate" has been and will be used in these articles to prevent confusion, but the word *anode* is usually applied to the current-collecting electrode and the word *cathode* to the current-supplying electrode in *gas* tubes.

The reader may wonder why gas tubes have not supplanted high-vacuum tubes, since they have a lower internal voltage drop and are, therefore, more efficient. The answer is that (most) gas tubes do not provide the control features available with high-vacuum tubes, and are not generally suited for such purposes as voice-frequency amplification in telephone circuits. Gas tubes are very useful for rectification, however, and for other special purposes. Gas tubes for speech amplification have been developed, but are not in wide use.

Summary

Electrons are liberated from metals by heating the metals or by shining light on metallic surfaces. The first method is employed in high vacuum and in gas tubes, and the second in phototubes.

In the high-vacuum tube, the electrons tend to build up a negative space charge sheath in the region close to the hot filament. This gives the tube a high internal resistance, and hence lowers its efficiency as a current-carrying device.

In the gas tube, the positive ions, produced by ionization by collision between electrons and neutral gas atoms, move slowly toward the filament and largely neutralize the space-charge effects. This gives the tube a low internal resistance, and hence one having a higher efficiency than the high-vacuum type.

The gas tube does not ordinarily have the control features provided by the high-vacuum tube, and its uses are limited.

In the next article of this series, the characteristics and uses of two and three electrode tubes will be discussed.

WAGE-HOUR ACT AMENDMENT INTRODUCED IN CONGRESS

PROGRESS is being made in efforts to so clarify the federal Wage-Hour Act as to definitely exempt small telephone exchanges. On Tuesday, February 7, a bill providing for amendment to the Act—to exempt from its provisions operators working in exchanges of 1,000 subscribers or less—was introduced in the House by Congressman Vincent F. Harrington, of Sioux City, Iowa.

This amendment is satisfactory to the wage and hour committee of the United States Independent Telephone Association and will receive its active support. It is understood that a similar amendment was to be introduced in the Senate later in the week when it resumed its sessions after a recess taken Monday, February 6.

Complete information regarding the amendment will be sent shortly to the telephone companies through the regular channels by the national association's wage and hour committee. The bill introduced by Congressman Harrington, providing for exemption from provisions of the Wage-Hour Act of operators employed in exchanges of 1,000 subscribers or less, is H.R. No. 3842. This number should be used in all communications to Congress.

Independent telephone companies should ask their Congressmen and Senators to support this amendment. Its passage by Congress will relieve them of endeavoring to comply with impossible provisions of the Wage-Hour Act.

Last week Senator McKellar of Tennessee introduced an amendment to the Wage-Hour Act. It provides, in a limited manner, that systems of 500 telephones or less be exempted from provisions of the act. The United States association's wage and hour committee believes that not even reasonably adequate relief to the Independent companies would be afforded by this amendment and, therefore, is not recommending support of it.

Telephone Exchanges in Spain Reported Undamaged

It is reported that the Spanish National Telephone Co., subsidiary of the International Telephone & Telegraph Corp., has come through the bombardment and capture of Barcelona by Generalissimo Franco's army without damage to its four exchanges in that city. During the forenoon of January 26, as the city was being occupied by the soldiers of the rebel army, telephone calls continued between Barcelona and the outside world without interruption.

Among the passengers on the American cruiser, Omaha, which sailed from Barcelona, January 25, were two officers of the Spanish telephone company: Fred Cauldwell, president, and George Dennis, treasurer. Four company officials, however, have remained in Barcelona.

During the civil war in Spain communication facilities have been maintained by the company on both sides of the fighting forces and not a single exchange has been damaged by shells or air bombs. The outside plant, however, has sustained some damage; this is estimated at 10 per cent.

In the Nation's Capital

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

A FAR-REACHING AND SIGNIFICANT PRECEDENT has resulted from U. S. Supreme Court decision in the so-called TVA case. . . . How the Tenth Amendment is affected by this decision and where it leaves private business with respect to possible invasion by government competition. . . . Reasons why Congress will go slowly on reorganization of FCC

IT IS NOT supposed to be particularly good taste to comment adversely upon the rulings of the United States Supreme Court when it is acting within that sphere in which it is supposed to be supreme—constitutional law. For a sometime member of the bar (to which your correspondent pleads guilty) such conduct is, perhaps, even more *lese majeste*.

And yet this writer cannot resist the temptation to state his honest belief that the Supreme Court's opinion in the so-called TVA case last week—by very reason of the fact that the court was backing away from a decision on the constitutionality of TVA operations—has resulted in a more far-reaching and mischievous precedent than most legal observers had anticipated.

Now don't get impatient and think right off the bat that this decision is just another one of those things that has resulted from the New Deal's fight with the power business. It is not, Mr. Telephone Man; it definitely is not. It concerns your business and every other line of business upon which a future Congress, under some passing radical pressure, may decide to embark the federal government as a commercially operating agency.

IT IS SO important that this writer wants to be the first dog to bark about it. It means that as far as the rights of private business are concerned, the Tenth Amendment is gone! Did you get that? The protection which the Tenth Amendment is supposed to give private business is gone right out of the Constitution. This was accomplished by a neat bit of judicial surgery in the White Marble Temple of the United States Supreme Court January 30.

The Tenth Amendment, in case you are rusty on your Constitution, reads:

"The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people."

"What does that mean to me?" you are saying to yourself. "How does this stuff about the reservation of the powers to the state affect me or my telephone business?"

Well, until January 30, lawyers took that amendment to mean that the federal government was not supposed to exercise any power, unless its right to do so was clearly set forth in the Constitution—such as the power to tax, or to raise an army, or to declare war, or to establish the currency.

Until January 30, lawyers generally supposed that it was the Tenth Amendment which kept the federal government, even when authorized by an Act of Congress, from going into the power business, or the telephone business, or into the business of manufacturing food, clothing, or automobiles.

Has the U. S. Supreme Court now said that the federal government may do any of these things? Of course not! The Tenth Amendment is still intact in the Constitution, technically. But it has been sealed up in a showcase of impenetrable procedural cellophane. It has been rendered sterile for practical purposes by judicial insulation.

It is unnecessary at this point to go over the tiresome details of the TVA litigation. We all know that the TVA constitutionally justified its right to manufacture and sell electric power because it is an "incidental" by-product of the indisputable function of the federal government to improve navigation and prevent floods upon the inland waterways used in interstate commerce. Such is the Tennessee River; there is no doubt about that.

The private electric utilities contended that this navigation and flood control stuff was simply a fake legal excuse to mask the TVA's real purpose to put the government in the power business.

As a practical matter, the average well-read citizen knows well enough that if it were not for the "incidental" electric power operations, few if any of these gigantic dams would ever have been built. But, after all, that quarrel is of no direct concern to the telephone industry or other industry. If the Supreme Court had decided the case on that issue, it would simply have been another piece of tough luck for the electric industry.

In other words, if, as many expected, the majority opinion of the Supreme Court had voiced a forthright approval of TVA power operations as a proper "incident" to fed-

(Please turn to page 21)

Fathers and Sons in the Ind

GEORGE EDWARD BAUMAN, district manager of the Illinois Commercial Telephone Co. at Tuscola, Ill., is the proud father of two sons who are employed in the telephone industry. Both **EDWARD** and **RICHARD** are with the Northwestern Bell Telephone Co. at Cedar Rapids, Iowa.

Mr. Bauman has had 38 years of varied experience in the telephone business. He was born in Nebraska City, Neb., August 15, 1880. After graduating from high school, he entered the service of the Nebraska Telephone Co. in August of 1900.

In the ensuing 10 years he served as lineman, wire chief and installation foreman of the Nebraska company. From January, 1910, until August, 1927, he was, successively, troubleman, installation foreman, city inspector and motor equipment inspector at Cedar Rapids, Iowa, for the Iowa Telephone Co. and its successor, the Northwestern Bell Telephone Co.

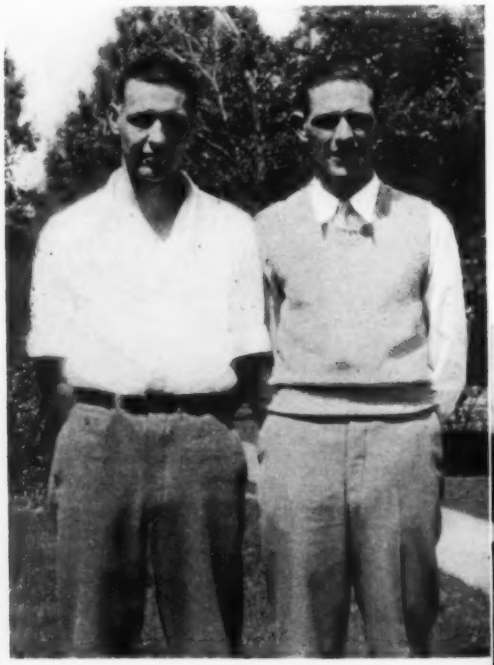
Then from August, 1927, to January, 1929, he was appraisal engineer for J. G. Wray & Co. of Chicago. From 1931 to 1934 Mr. Bauman served, successively, as division engineer for the United Telephone Co. (San Antonio, Texas, division) and as district manager for the Southwestern Associated Telephone Co.

His next experience was with the Kansas State Telephone Co. as commercial superintendent, from July, 1934, to May, 1935. From May, 1935, to December, 1936, he served as vice-president and general manager of the Central Missouri, Arkansas, Associated and Peninsular Telephone companies. Since December, 1936, he has been stationed at Tuscola, Ill., as district manager of the Illinois Commercial Telephone Co.

He is a Mason and a member of the Rotary Club. Hunting and fishing are his hobbies.

EDWARD BAUMAN, the elder of the sons, was born July 1, 1904, in Nebraska City. Neb. Although he has been regularly employed by the Northwestern Bell Telephone Co. at Cedar Rapids for 15 years, his telephone experience dates back to his high school days when he was employed Saturdays, Sundays and during vacations. Although Edward has had considerable outside experience, he has been engaged for the greater portion of his time as a testboardman.

RICHARD BAUMAN was born August 8, 1910, in Cedar Rapids. As was the case with his brother, he secured his first telephone experience while still in high school. Although for several years employed as a switchboard man at Tuscola, he is now serving as district repairman at Cedar Rapids, Iowa.



G. E. BAUMAN, district manager of the Illinois Commercial Telephone Co., at Tuscola, Ill. (below) has two sons in the telephone industry. Both are with the Northwestern Bell at Cedar Rapids, Iowa. RICHARD, shown to the extreme left, is district repairman. The other son, EDWARD, is testboardman.

J. R. PORTER, president of the Carolina Telephone & Telegraph Co., Tarboro, N. C., plays golf frequently with his son, KNOX DAVIS, who is employed by the American Automatic Electric Sales Co., making his headquarters in Tarboro.

JOHN RUCKER PORTER, president of the Carolina Telephone & Telegraph Co., Tarboro, N. C., has a son, **KNOX DAVIS,** who is with the American Automatic Electric Sales Company.

J. R. PORTER has had more than 38 years of experience in the telephone business. He was born December 10, 1880, at Lillards Mills, Tenn., and was educated at the Waverly Normal School, Waverly, Tenn., and the Montgomery Bell Academy, in Nashville, Tenn.

His first connection with the telephone industry was in the auditing department of the old Cumberland Telephone & Telegraph Co. in Nashville. In 1904 he served as manager, for a brief time, of its Corbin (Ky.) exchange. For the next year and a half he was manager at Eminence, Ky. He was then transferred to Henderson, Ky.

In the spring of 1908 he was transferred to Chattanooga, Tenn., as manager. About five years later he became superintendent at Knoxville, Tenn. Early in 1918 he became

Independent Telephone Industry

THIS IS THE NINTH of a series of articles featuring "Fathers and Sons in the Independent Telephone Industry" . . . Through the publication of pictures of fathers and sons, with brief biographical notes, TELEPHONY is introducing these sons—the younger generation and tomorrow's potential leaders—to one another and to the field in general.

general manager of the Home Telephone & Telegraph Co. and the Home Telephone & Telegraph Co. of Virginia, with headquarters at Henderson, N. C.

In February, 1926, Mr. Porter became executive vice-president of the Carolina Telephone & Telegraph Co. and the Home Telephone & Telegraph Co. of Virginia with headquarters at Tarboro, N. C. Just a year ago he was elevated to his present post of president of the Carolina company, continuing also his duties as executive vice-president of the Home Telephone & Telegraph Co. of Virginia.

During the 21 years in which he has served as the executive officer of the Carolina company and the Home company of Virginia, Mr. Porter has witnessed the steady growth and expansion of these companies. At the present time the Carolina company operates approximately 80 exchanges and more than 31,000 stations, and the Home company operates 14 exchanges and about 2,800 stations.

He has been active in state and national associations, being a director of the U. S. Independent Telephone Association and a member of the North Carolina and Virginia Independent associations. Mr. Porter enjoys golf and is frequently seen on the local course, often playing with his son, Knox.

KNOX DAVIS PORTER was born at Dickson, Tenn., October 23, 1906, and was educated at the Virginia Military Academy and the Pratt Institute in Brooklyn, N. Y. During his summer vacations from school he worked for the Carolina Telephone & Telegraph Co.

After taking the student training course of the Automatic Electric Co. he served as junior engineer for the Carolina Telephone & Telegraph Co. For the past three years he has been associated with the American Automatic Electric Sales Company, with headquarters in Tarboro, N. C. His spare time is given to gardening and golf. How's his game?—well, ask his dad; he knows.

Three generations of the Daubendiek family are represented in the Independent telephone industry. From left to right in the front row are: W. H. DAUBENDIEK, secretary-treasurer of the West Iowa Telephone Co., Remsen, Iowa; his son, C. H., who is general manager of the West Iowa company; his grandson, Wm. C. In the second row are two other grandsons of W. H. Daubendiek—Eugene R. and Joe E.

W. H. DAUBENDIEK, secretary-treasurer of the West Iowa Telephone Co., Remsen, Iowa, reports that three generations of his family are now represented in the Independent telephone industry, as he himself is rounding out his 40th year. His son, **C. H. DAUBENDIEK,** who is general manager of the West Iowa company, has been in the business since his early boyhood, a period of nearly 35 years.

Four grandsons of the elder Mr. Daubendiek (sons of C. H.) he reports, are all staunch Independent telephone men. They have all had experience in climbing poles and building telephone lines. Their names are: WILLIAM C., ROBERT W., EUGENE E., and JOE E.

W. H. DAUBENDIEK is one of the oldest active telephone executives in Iowa. Born in Germany, where he graduated from public school at the head of his class in 1880, he migrated to this country in 1886, shortly after his father's decease, engaging in the hardware business with his brother.

Moving to Lincoln, Neb., in 1887, he engaged in the manufacture of horse-drawn vehicles, later establishing a carriage factory at DeWitt, Neb. After his marriage, he became interested in farming. In fact, he purchased and operated several sizable farms.

But when the panic of 1897 came, he sold his farms to partly satisfy his creditors. After a few years more of hard work, he repaid every dollar of indebtedness which he had incurred. When the first automobile put in its appearance, he was tempted to embark upon the manufacture of this new type of conveyance but it would have meant a considerable credit risk. And this he was unwilling to undertake, after his all too recent and unfortunate experience in finance.

Another new business, however, was appealing to venturesome young men. And in 1899 Mr. Daub-

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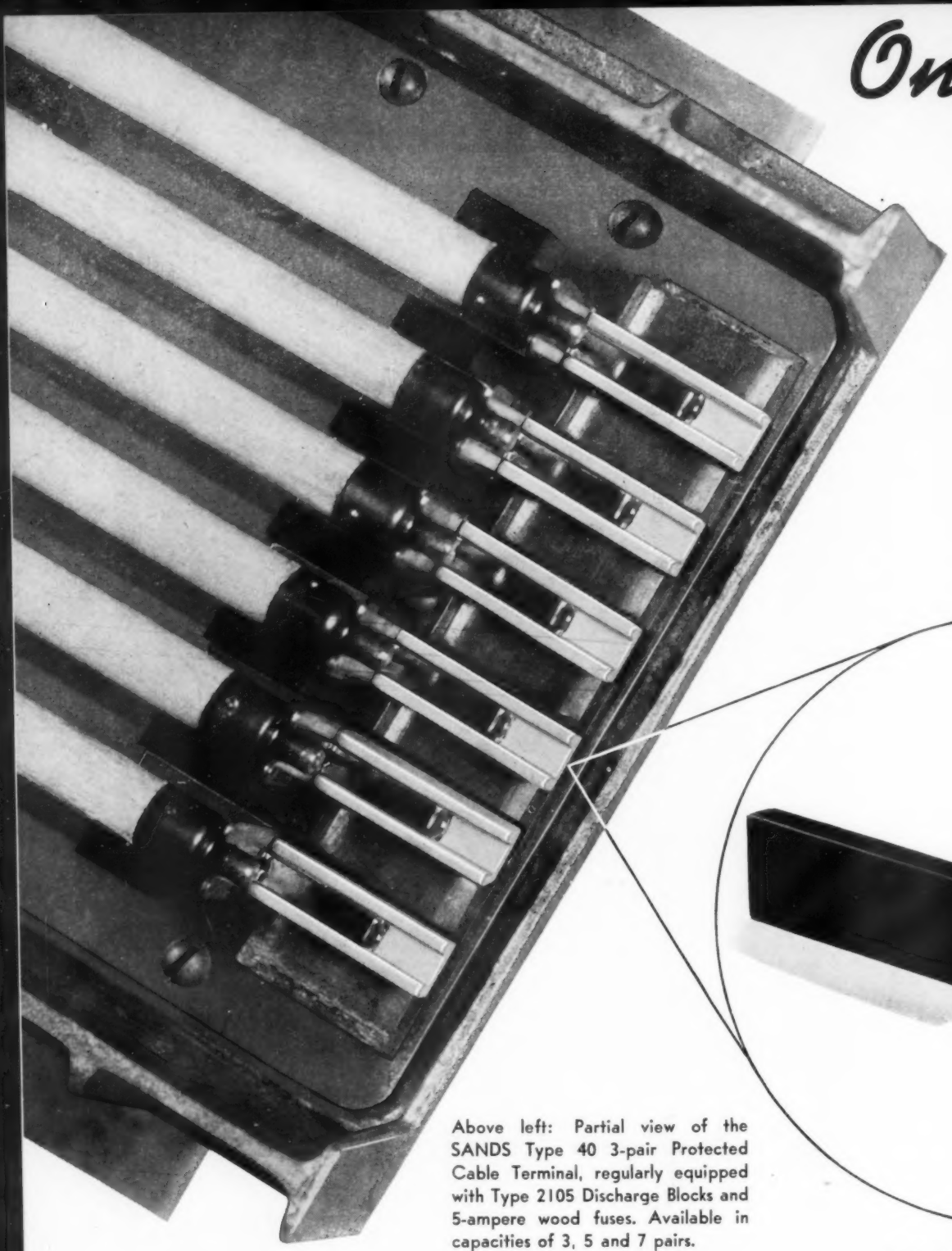

Above left: Partial view of the SANDS Type 40 3-pair Protected Cable Terminal, regularly equipped with Type 2105 Discharge Blocks and 5-ampere wood fuses. Available in capacities of 3, 5 and 7 pairs.

SANDS PROTE

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s famous Type 2105 Discharge Block!

When protective equipment to guard expensive telephone plant, you want to that you are getting complete protection — not only against lightning, but against power crosses and currents as well. Due to the large number of rural power lines recently ted and under construction, these latter factors are becoming more and more important elephone companies.

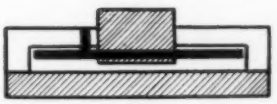
The Type 2105 Discharge Block—found only on SANDS protection equipment—insures tifically complete protection from every type of dangerous potential. The design of protector is superior, both in its method of operation and in its reliability of continued ormance. Every telephone man will want to study carefully its unique design and exclusive features. We enumerate below several of its more important advantages.

1. High quality carbon to carbon discharge surfaces. (No metal to burn away and enlarge the gap beyond safe limits.)
2. Air gap held to microscopically close tolerances in manufacture. (Assures uniform reliability of operation.)
3. Grounds line automatically on currents of ½ ampere or more. (Prevents dangerous deterioration from continued arc.)
4. Automatically resets itself after current ceases. (Eliminates continual inspection, resetting and replacement expense.)
5. Air gap type—fully enclosed—self-cleaning. (Cannot fill up with dust and moisture and thus become ineffective.)

The next time you buy protective equipment, be sure to insure complete protection by specifying SANDS — the only protection equipment which comes regularly equipped with the Type 2105 Discharge Block! Write today for prices and full information.

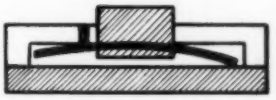
AS SIMPLE AS A, B, C:-

-A-



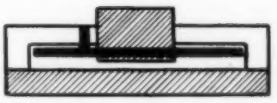
When lightning or other current passing between carbon blocks exceeds ½ amp., the thin bi-metallic strip—

-B-



curls as shown here, shorting out the arc and grounding the line as long as the discharge continues. As soon as it ceases—

-C-



the bi-metallic strip cools and straightens out, thus automatically "resetting" the block to its normal condition.

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endiek embarked upon a telephone career in a small way, by establishing service for the first 10 subscribers in DeWitt, Neb. He gradually extended the lines and was the first to build a farm line in that section of Nebraska. To his local and farm lines, in due course of time, he added toll lines. He promoted and built the DeWitt municipal electric light plant and also had a part in organizing and establishing the Crete Telephone Co., which now operates about 800 telephones.

In 1912 Mr. Daubendiek sold his DeWitt telephone property and moving to eastern Iowa, he purchased a run-down telephone plant. After rebuilding it and putting it on a sound basis, he sold it and moved to the southern part of the state. Then, in 1917, he purchased the West Bend exchange, which became the nucleus for the telephone system now operated by the West Iowa Telephone Co., of which he is secretary-treasurer.

After rebuilding the West Bend exchange, the Rolfe exchange was purchased by Mr. Daubendiek. When it had been placed in shape, he sold it and purchased the Anita exchange. Subsequently, he acquired the Alton, Remsen, Quimby, Sutherland, and Marcus and other exchanges in the West Iowa company. More than 3,000 telephones are now operated by the West Iowa company.

All in all, Mr. Daubendiek has supervised the rebuilding of 13 telephone plants, placing wires underground in clay ducts in many of the towns, installing new central office equipment, arranging for joint use of poles with power concerns where practical, etc. He is now supervising the rebuilding of his 14th exchange—that at Jefferson, Iowa.

In addition to his connections with the West Iowa Telephone Co., Mr. Daubendiek is president of the Jefferson (Iowa) Telephone Co., a recent reorganization of the Citizens Mutual Telephone Co. He is president of the Iowa State Bank at West Bend and has been identified with farming nearly all of his life.

C. H. DAUBENDIEK, manager of the West Iowa Telephone Co., has been engaged in telephone work since his boyhood, a period of approximately 35 years. With the exception of a few years when he was employed by the Bell company and a brief period when he adventured in the field of farming, he has been continuously identified with the Independent telephone industry.

For some time he was engaged in cable work for neighboring telephone companies in Iowa. After serving as plant chief for the West Iowa company for a time, he was elevated to the post of manager.

The four sons of C. H. Daubendiek have all had experience in telephone plant work, putting in their vacations during school years and available time after school hours. William C., the oldest, has been directing the work of a construction crew during the summer months. As mentioned previously, the other three boys are named: Robert W., Eugene E., and Joe E. Daubendiek.

Mrs W. H. Daubendiek deserves mention in a biographical sketch of the Daubendiek family. It was she who operated the first telephone plug type switchboard in the Daubendiek home in southern Nebraska when Independent telephony was in its infancy. Later she operated a regular cord type switchboard for 10 years. Her only daughter, Letha, has been auditor of the West Iowa Telephone Co. for many years and has a host of acquaintances in telephone circles throughout the state of Iowa.

A nephew of W. H. Daubendiek is also engaged in the telephone business. He is F. W. Daubendiek, who is acting as local manager of two of the exchanges of the West Iowa Telephone Co.

CAN YOU KEEP A SECRET?

BY ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

"THE SECRET of my friend is not mine." When I am entrusted with a friend's confidence, it indicates that the friend has faith enough in me to feel sure she can tell me something which affects her life in one way or another and that I will not tell anyone, no matter how much I trust such a one.

Recently I read an intensely interesting story concerning two school girls who were fast friends. Flora, one of the girls, had a very lovely-looking mother who was greatly admired, particularly by men. She doted on admiration. Hocum residents noticed everything she did and some made unpleasant remarks.

One evening there was a moonlight picnic scheduled for the young and old of certain select families. It was to be held in a park by a beautiful lake on which people enjoyed boat-riding. At the last minute, the lovely-looking mother told her young daughter that she could not go to the picnic as she wanted to see her other daughter, in a nearby city, who was not well.

After the picnic was over, some of the party drove out into the country, for the night was beautiful. Later they returned to the park to get a basket that had been overlooked. The two girls asked permission to run down to take a last look at the lake. It proved fortunate that they went alone. Two persons, a man and woman, were boat-riding.

"Why, there's mother!" exclaimed Flora. "I thought she was going to Galena tonight."

Her little friend also recognized Flora's mother but said nothing. Furthermore, she never told a single member of her family or anyone else as long as she lived. And so no one ever knew about that boat ride except those four persons.

Telephone operators, particularly those working in small one or two-position switchboard exchanges, are entrusted with the most private affairs of their subscribers. When students, they are informed of the penalty likely to be imposed for divulging telephone communications. I believe this law does not protect the public as much as does the honor of the operator.

George Washington was once asked by a particular friend, on the morning of a certain battle, what his plans were for the day. He replied, "Can you keep a secret?" The friend answered in the affirmative. Washington then said, "So can I."

Moral: *Can you* keep a secret?

IN THE NATION'S CAPITAL

(Continued from page 15)

eral functions with respect to navigation, flood control, and so forth, the net result would have been that the federal government would still be constitutionally restricted to the generation (and perhaps the marketing) of electric power. And, of course, even that power would have been more or less restricted to "hydroelectric" generation, which would have necessarily limited them both to various river sites here and there throughout the country.

But that is not what happened. Instead, the court simply ruled out the right of the private companies to object to government competition. By its very caution it has thus left the door wide open for further and unlimited adventures of the federal government into the field of business enterprise.

The Supreme Court virtually told the private utilities that it was none of their business what the federal government is doing with the taxpayers' money and that, constitutional or otherwise, competition alone—even though it curtails or destroys an established private business—does not entitle the injured party to a protesting voice in the federal court.

NOW LET US see just where this ruling leaves private business with respect to the possible invasion by government competition. If the private utilities cannot be heard to complain against the government competition of a questionable constitutional character, who can hale the federal government before the court for a constitutional inspection?

The Supreme Court held years ago that the individual taxpayer has no right to maintain a suit to question the validity of federal expenditures. In 1936 the Supreme Court by a 5 to 4 decision in the so-called Ashwander case held that minority stockholders might rightfully maintain a suit to question the validity of the TVA's power operations in connection with an attempted contract between TVA and the corporation in which they held shares. But that decision—by the narrow margin of one justice—was issued in 1936 before Justices VanDevanter, Sutherland and Cardoza were succeeded by Justices Black, Reed and Frankfurter.

A mere statement of this change in the membership of the United States Supreme Court raises a serious doubt—to put it mildly—whether the court would follow its own precedent, even assuming the unlikely possibility that another minority stockholders' suit involving a contract between the TVA and a private utility company could again be formulated.

Who, then, is left to complain against future unconstitutional invasion by the federal government into the field of private enterprise?

By process of elimination we see that only the sovereign state itself would seem to have any remaining right in court. It may be that the continued extension of TVA operations may bring its program into conflict with the interest of the state on such matters as taxes or eminent domain. But to date the indications have all been in the other direction.

The sovereign states have been too busy gobbling up the handouts of federal funds which accompanied these federal projects to raise any question about the constitutionality of the program. The mere hint that a state might be hesitating—as Oklahoma did a couple of weeks ago—is sufficient to result in bringing the state politicians to their knees by threats that the golden stream of federal subsidy will be forever withdrawn from them and their constituents.

So we must perforce face the situation squarely. Other lines of business must get over their complacent assumption that the New Deal vendetta against the power industry is a private quarrel in which other interests should not concern themselves. Under the ruling of the U. S. Supreme Court in the TVA case there is nothing to prevent the federal government from going into the telephone business, for example, and saying in effect: "It may be unconstitutional but you are estopped to prove it in the court."

Doubtless, the Supreme Court would hasten to close this door if the federal government tried to take such extreme advantage of the situation. Nevertheless, the danger—especially in view of the public hysteria that might develop as part of an international war crisis requiring extreme measures for the national defense—should serve to rally other lines of business to the end that the Tenth Amendment of the Constitution should not be ignored by the Supreme Court.

OF COURSE, it must be understood that all the foregoing discussion presupposes that a future Congress might conceivably authorize the federal government to go

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into private business other than electric power. As a matter of fact, there is no present discernible indication that the relatively more conservative 76th Congress would ever consent to such a thing. It is important to remember that the 75th Congress might have done such a thing under sufficient pressure, and the 74th might have been equally sensitive to government ownership pressure if enough of it were applied from the direction of the White House.

That is the whole point of this comment. It is to emphasize the fact that a constitutional bulwark of a permanent and lasting nature—which we have always supposed would protect private business from passing popular fancies of state socialism as reflected in Congress—has been virtually destroyed. It is in the hands of Congress, therefore, that further protection of private business must be found.

Maybe the fruit of this decision will be that business will awaken to the danger and rally behind a proposal for an "anti-communist" amendment to the Constitution. There doesn't seem much present likelihood of such a proposal being enacted by Congress, but a discussion might be helpful as a matter of public education.

Look at the child labor amendment which has been kicking around the state legislatures for the last decade. It probably will never become part of the Constitution now for the simple reason that there is no further need for it. In the very process of debating the evils of child labor, we have already virtually abolished it. Thus we have accomplished the reform without constitutional mandate —which is all to the good.

It should be fairly stated that the Supreme Court's decision in the TVA case can be easily rationalized in a legalistic way. There is much precedent to support the proposition that a private business, which is operating without an exclusive franchise, cannot be heard in court to question the internal validity of its business competitor. But, as Justice Butler pointed out in the dissenting opinion, if an injured private business cannot raise the issue, it is doubtful if the question of constitutionality of federal business operations could ever be presented.

To the intelligent layman, certainly this idea that the federal government might exceed its constitutional power right and left, without anybody having the technical right to question it in court, must seem to be an example of legal quibbling and pettifoggery. To a private industry faced with annihilation by unfair competition from its own government, it must seem like a decision such as Pontius Pilate would have made.

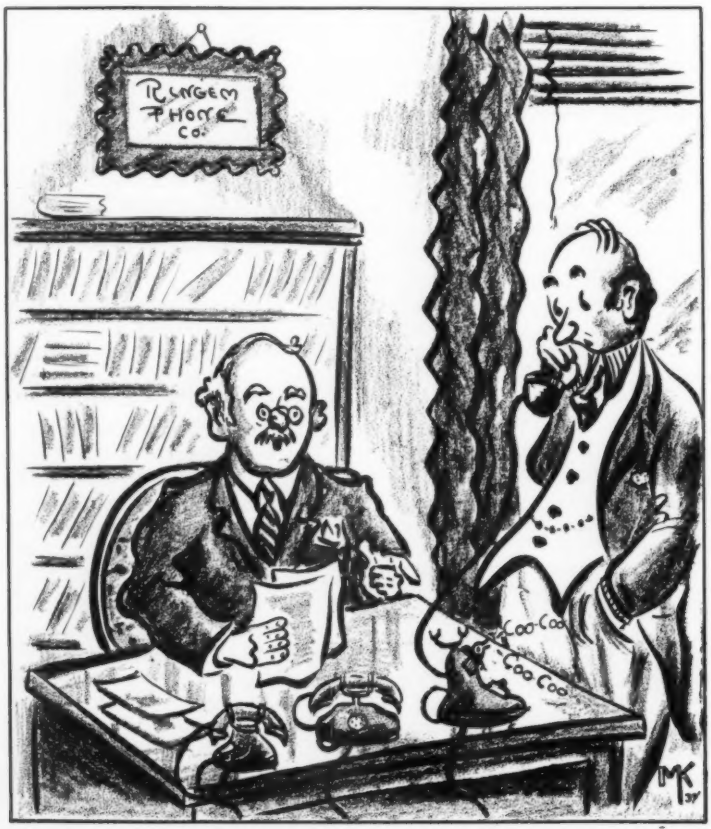
Certainly, if the court had decided the other way—in favor of the utilities and against the government—on similarly procedural grounds, we would hear the radicals squawking from one end of the land to the other about the inequity of a reactionary judiciary.

BY THE TIME these lines appear in print, the draft of proposed legislation to reorganize the FCC, which Senator Wheeler of Montana and Chairman McNinch are cooking up at this writing, will probably be a matter of public information. As far as these two parties are concerned, the President's request for reform of federal regulation of communications will be carried out in two sections: (1) A bill reorganizing the administration—that is to say, the membership—of the FCC, and (2) a bill which will define the policies of the commission.

Just how far Senator White, Republican of Maine, who was the third party to the McNinch-Wheeler conference, will go along with this plan is not known. He may agree with some angles of it, but this writer doubts very much whether he will concur with the now apparent strategy of the Administration to push through its ripper bill as quickly as possible and leave the more controversial matters of FCC policy to be chewed over by Congress at its leisure.

In fact, no recent development has occurred to alter this writer's view that Congress, as a whole, will not approve any drastic reorganization of the FCC until there is a complete investigation and understanding of all of the factors of conflict—which means not only questions of policy, but questions of administration, as well. So it still seems that Congress will investigate but not legislate at this session.

Probably one of the principal reasons why Congress is going to go slow on the Administration's attempt to rip the FCC is the character of President Roosevelt's recent appointments. You may recall that shortly after the November elections, this



"That's our latest model telephone; the cuckoo device informs 'talkative' users on party lines when their time's up."

COMING CONVENTIONS

Texas Telephone Association, Baker Hotel, Dallas, March 22, 23 and 24.

Oklahoma Telephone Association, Huckins Hotel, Oklahoma City, March 27 and 28.

Kansas Telephone Association, Municipal Auditorium, Junction City, March 30 and 31.

Missouri Telephone Association, Hotel Muehlebach, Kansas City, April 3 and 4.

Nebraska Telephone Association, Lincoln Hotel, Lincoln, April 11 and 12.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, April 18-20.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 25 and 26.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 10 and 11.

Pennsylvania Independent Telephone Association, Yorktowne Hotel, York, May 18, 19 and 20.

New York State Telephone Association, Hotel Syracuse, Syracuse, May 23, 24, 25 and 26.

The Illinois Telephone Association, Pere-Marquette Hotel, Peoria, June 7 and 8.

Wisconsin State Telephone Association and Wisconsin Locally Owned Telephone Group, Park Hotel, Madison, June 13-15.

writer pointed out that the anti-utility forces in Congress (sometimes known as the "power bloc") suffered much more (proportionately) at the polls than did the average run-of-the-mill Democrats in Congress.

You may recall, also, that this writer warned that the President might reward these fallen crusaders in a manner which may prove more troublesome to the utilities than if they were still in Congress—meaning that the President might dump them into the administrative agencies.

So far, at least, four of these anti-utility lame ducks have found their reward on the federal payroll. The most startling example was the President's appointment of the avowed government ownership radical, ex-Representative Amlie of Wisconsin, to the ICC. This has given pause to Republicans and conservative Democrats in Congress who are wondering whether if the President were to be given another FCC—all ripped, cleaned and ready for a complete new set of Roosevelt appointees—he might follow this indicated line of action by appointing three Amlies to the FCC.

To the telephone, radio, and telegraph industries this thought should also give considerable pause. There is nothing wrong with ex-Representative Amlie, personally; he has always been perfectly sincere and open about his views on government ownership. It is simply the idea of putting a man who believes in government operation rather than government regulation at a post where it would be his duty to exercise federal regulatory powers.

The appointment seems about as incongruous as would be the naming of John L. Lewis to the presidency of the U. S. Chamber of Commerce, or the naming of the president of the U. S. Chamber of Commerce to the chairmanship of the National Labor Relations Board.

SYMPATHETIC understanding of the industry's plight if the Wage-Hour Act is thoughtlessly imposed upon it, was manifested by Wage-Hour Administrator Andrews in his conference with the committee of the United States Independent Telephone Association. However, he is in a difficult situation with respect to propositions to amend the law he is bound to administer.

Were he to give positive approval to amendments exempting Independent telephone exchanges, he would be besieged by a host of other industrial claimants for exemption, from the oyster dredgers of the Maine Coast to the nut-pickers in sunny California.

Under the circumstances about the most that can be reasonably expected is that Administrator Andrews will remain relatively neutral when a Congressional committee considers the bill proposed by the United States association for limiting the application of the Wage-Hour Act.

At this writing a bill by Senator McKellar of Tennessee, exempting systems having not more than 500 telephones, had already been introduced, while the national association's own bill granting more comprehensive relief was still in the drafting stage. It probably will have been introduced by the time this appears in print. If enacted, it would grant exemption from the application of the federal Wage-Hour standards to Independent telephone exchanges of around 1,000 subscribers or less.

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Theory of Modern Television (Cont.)

Theory of Operation—Vertical Circuit

The frequency of the current applied to the vertical and horizontal coils is determined by the frequency of two local sweep oscillators. These oscillators are synchronized with the television transmitter by impulses received with the television signal. Fig. 22 shows a vertical sweep oscillator circuit as designed by RCA for use with its type 1800 kinescope.

This circuit must supply a sawtooth wave of about 60 cycles to the vertical coils. Referring to this circuit, it will be seen that it consists of two tubes, one a 6-N-7 and the other a 6-C-5. The 6-N-7 is a twin triode type. The 6-C-5 an ordinary triode. The 6-N-7 tube serves as both oscillator and amplifier, while the 6-C-5 is used only as an amplifier. The operation of the circuit is as follows:

One triode section of the 6-N-7 is connected as a simple plate feed back type oscillator. In this circuit, oscillations are started and the grid of the oscillator portion of the 6-N-7 swings alternately positive and negative. On the positive half-cycle the grid attracts electrons from the cathode. These electrons, in flowing through resistors R_1 and R_2, cause a negative voltage to build up across condenser C_1 and the two resistors.

After a few oscillations the bias voltage becomes sufficiently large that the high negative voltage on the grid of the oscillator tube causes it to stop oscillating. As soon as oscillation stops, the charge on condenser C_1 leaks off through resistors R_1 and R_2 and thus removes the high negative grid bias which accumulated on the oscillator grid and permits oscillations to again start. This cycle of starting and stopping is repeated over and over at a frequency determined by the capacity of C_1 and resistances of R_1 and R_2.

This type of frequency generator is known as a blocking oscillator. It will be observed that the grid of the amplifier section of the 6-N-7 is connected directly to the grid of the oscillator section. The plate current of the amplifier section, therefore, rises to a substantial value during the period of oscillation. As soon as oscillation stops due to the blocking action

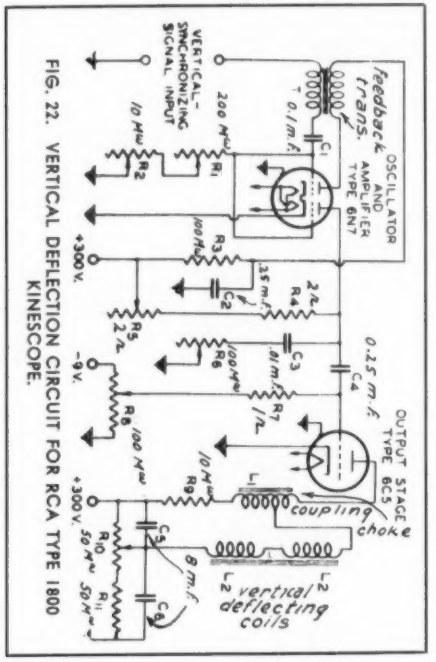


FIG. 22. VERTICAL DEFLECTION CIRCUIT FOR RCA TYPE 1800 KINESCOPE.

in the oscillator, the plate current of the amplifier section falls to zero. The variable plate current flowing through the amplifier section of the twin triode and through resistors R_4 and R_5 causes the plate voltage of this section to vary from a low value to a high value because of the voltage drop in resistors R_4 and R_5.

During the period that the amplifier D.C. plate current drops to zero, the plate voltage starts to rise; but because of the time constant of condenser C_2 charging through the high resistance resistors, R_4, R_5, and R_6, this plate voltage increases at a relatively slow rate. The rate is limited by the time constant of the resistors and condensers. It can, therefore, be seen that the plate voltage of the amplifier section of the 6-N-7 goes through an abrupt decrease in value followed by

a relatively slow increase and, hence, has approximately sawtooth wave form.

This plate voltage is impressed on the grid of the 6-C-5 in the output stage by virtue of the coupling condensers, C_4, and the resistor R_7. This causes the plate current of the output stage to vary in like manner; and thus we have in the output circuit of the 6-C-5 a sawtooth wave form which can be applied to the vertical deflection coils.

It will be observed that input terminals are provided on the vertical deflection circuit which permits a vertical synchronizing signal, supplied by the incoming television signal, being impressed on the grid of the oscillator triode. This synchronizing signal tends to "trip the grid" of the oscillator so as to synchronize the oscillations produced locally with those of the vertical sweep circuit of the distant television transmitter.

Vertical Deflection Controls

The manual controls which are used in synchronizing and adjusting the vertical deflection circuit are referred to as follows:

(1) vertical frequency control (R_1 and R_2)
(2) vertical size control (R_5)
(3) vertical peaking control (R_6)
(4) vertical distribution control (R_8)
(5) vertical centering control (R_{10})

The vertical frequency control regulates the speed or frequency of the current supplied the vertical deflection coils. Increasing the resistance of R_1 or R_2 decreases the frequency of the oscillations, as a longer time is required for the negative blocking charge to leak off to ground. The locally-generated oscillations are adjusted so as to synchronize with those at the distant transmitter.

If incorrectly adjusted the received picture will drift vertically on the screen. The term "drift" refers to the television picture getting out of frame, much in the same manner as moving pictures do. However, the picture seems to move up or down on the screen, depending on whether the locally-generated vertical deflection oscillations are higher or lower than those generated at the television transmitter.

The Operators' Corner

By MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

STRONG employe morale is an asset to every business organization. Series No. 355

THE PERSONNEL of any organization controls the life and success of the business, therefore strong employe morale is one of the finest and most essential assets an organization can possess. There are many channels through which the proper employe attitude can be developed but none is more important than the principle of giving each employe "a square deal."

About a year ago the writer learned of a case where an employe had nursed a grudge toward her company for several years due to the fact that she had been misinformed regarding the manager's attitude toward her and her work. This came to light when she was approached to accept the position of chief operator in her exchange.

When she hesitated about accepting the position and was asked why, she brought to light the grievance that had been in her mind for a long time. Inasmuch as it was a fancied grievance, due to being misinformed, after a satisfactory explanation she cheerfully accepted the position with all of its responsibilities and is doing a satisfactory job, according to all reports.

Imagine coming to work day in and day out with a feeling that your employer did not think well of you or your efforts! How many discouraging days this girl must have experienced! And it was such a simple thing to straighten out this disillusion when it reached the ear of the proper person. Unfortunately, these things too frequently reach every ear except the right one.

Another important item in creating employe goodwill is appreciation of the employe's point of view, combined with a sympathetic understanding of his or her problems. Employes should be afforded an opportunity to present suggestions which in their opinion will improve the service. It is true, of course, that the company is not able to carry out all of the suggestions offered, either from a standpoint of practicality or economy, but every employer can and should be interested in the employes' suggestions.

If the management is approachable, and open to suggestions, employes will not only discuss matters pertaining to the work of the company but frequently will seek advice on personal matters, such as finances, family relations, buying a home, and involved legal problems. While it is true these problems do not pertain to the employe's work, the wise executive realizes that they *do* have a direct bearing upon the quality of the individual's work. No one can do a good job when he or she is harassed and worried.

People in supervisory and executive positions should make it easy for employes to approach them.

After all, what is the difference between employer and employe, traffic supervisor and chief operator, supervisor and operator? Not a thing except that each individual has his or her respective responsibility in accordance with the position they happen to occupy in the organization brought about by experience, education, opportunity, ability and personality. All are gainfully employed for the purpose of making the wherewithal to supply themselves with the comforts of life.

There should be no fence or barrier between employer and employe. All are entitled to fair treatment and all should cooperate with a common aim in view: to give a service to the people in their community of which the employes as well as the company can be justly proud.

Questions from Illinois Operators

1. How long is one supposed to wait for TX at called place to answer?
2. On a person-to-person call, the called party is UX and another party of the same company is called at another city. Is there a report charge on the first call, or is it considered one ticket?
3. Should operators meeting on a circuit argue at length concerning who is entitled to the circuit?
4. When do you enter the filing time in the filing time space?
5. When a long distance operator comes on the line and says "MX," what does she mean?

The answers to these traffic questions are given on page 32.

KLEIN "Lightweight" CLIMBERS

Klein "Lightweight" Climbers are built to the minimum weight possible consistent with maximum safety. Every pair is tested exactly the same as are the old time tried Standard Climbers. The lineman can throw his weight on these climbers with confidence —they are Klein's!

DISTRIBUTED THROUGH JOBBERS

Foreign Distributor: International Standard Electric Corp., New York

The four pamphlets listed below will be sent without charge to anyone interested. Check the ones you want:

- ☐ Lightweight Climbers.
- ☐ Specifications on Linemen's Belts and Safety Straps.
- ☐ Klein Kord Fabric Safety Straps.
- ☐ Pocket Tool Guide.

Mathias KLEIN & Sons

3200 BELMONT AVENUE

Here and There in the Field

Merchants Advocate Telephone's Use During Snowstorm

During the recent record-breaking snowstorm that blanketed northern Illinois, a group of Peoria stores ran an ad in a local newspaper telling the people to "Shop by 'Fhone" and "Let it Blow! Let it Snow! These merchants are as near as your telephone. . . . Storm, slush and snow do not stop their year 'round service to customers."

That this ad was effective in directing attention to use of the telephone, is suggested by a news item which appeared in the next day's edition:

"As all Peoria began to stir after the night's deluge of snow, telephone wires hummed with messages and brought into service every operator the Illinois Bell Telephone Co. could muster.

"Too numerous to handle, calls swamped exchanges and made it extremely difficult for operators to complete them. Trunk lines from downtown to the bluffs were all overloaded. To cope with the situation, the company rounded up all of its operators and even drafted clerks from the business office and others with switchboard experience.

"Hampered in more ways than one by the lack of transportation facilities which set wires humming, the company was forced to send trucks and men with shovels to taxi operators to work. At least a dozen trucks made the rounds, bringing operators to work; and company officials went to work in the same manner.

"Only in the forenoon of the following day did the capacity load drop off. No lines were down as a result of the storm."

▼ ▼

Good Service vs. Mediocre Service

BY YE OLDE OBSERVER

The other evening, while returning to my home from a theater, I switched from my dim lights to headlights; but I didn't make the change fast enough and, consequently, there were no big lights. I still had my dim lights and continued on my way, deciding to have the matter attended to the next day.

The following day I went into a large chain service station and explained what had happened. I had been purchasing gas and oil quite frequently at this station and so was fairly well-known. The attendant consulted the mechanic, who is always on duty, and the reply was to the effect that he could do nothing right then but would look at the car that night.

Needless to say, I drove to another station of the same chain, where again I have had the odd oil and grease job done, but what a difference in service I experienced! After explaining my difficulty to the attendant, he and not the mechanic immediately realized that the bulbs would have to be replaced and offered to do so at once.

He did so in less than five minutes, suggesting a stronger type of bulb on account of the dark evenings during the winter months. The whole matter was handled in such a friendly, personal manner that I had the tank filled, and the total sale amounted to $3.25.

Can't we, as good telephone people, learn a lesson: Never be too busy to attend to our subscriber's need, to render a "Service Sparkling with Individual Attention."

ARE YOU
Snowbound?
Our Store Is as Near as Your
telephone
JUST CALL 8101—
PERSONAL SHOPPING
Ask for the Personal Shopper. She'll do your shopping for you and you'll not have to plow through an inch of snow. Just give her your order for Galoshes, Snow Shovels, Blankets, Ski Suits or Sleds.
DELIVERIES ON SCHEDULE
No need to worry about Block and Kuhl's trucks getting through. We have a corps of drivers that like nothing better than plowing through a snow bank. Whether your order is for a suite of Furniture or a package of Aspirin, we'll get it to you—on time.
BLOCK AND KUHL CO.

During a recent heavy snowstorm in northern Illinois, merchants utilized newspaper advertising space to urge use of the telephone for ordering supplies and materials.

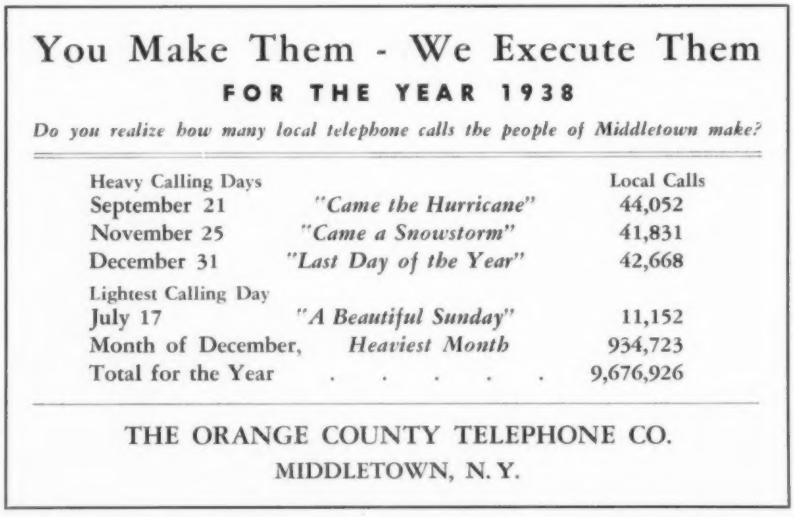
▼ ▼

Highest Engineering Award to Dr. Frank Jewett

The John Fritz medal was awarded January 25 to Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, Inc., and vice-president of the American Telephone & Telegraph Co., for "his vision and leadership in science and for notable achievement in the furtherance of industrial research and development in communication."

Conferred at the winter meeting of the American Institute of Electrical Engineers in New York, this medal was presented jointly by the A. I. E. E., the American Institute of Mining & Metallurgical Engineers, the American Society of Mechanical Engineers and the American Society of Civil Engineers. It is recognized as the highest honor in the engineering world, and was first awarded in 1905.

In making the medal presentation, Karl T. Compton, president of the Massachusetts Institute of Technology, said he rejoiced in the opportunity to say


You Make Them - We Execute Them
FOR THE YEAR 1938
Do you realize how many local telephone calls the people of Middletown make?
Heavy Calling Days
Local Calls
September 21 "Came the Hurricane" 44,052
November 25 "Came a Snowstorm" 41,831
December 31 "Last Day of the Year" 42,668
Lightest Calling Day
July 17 "A Beautiful Sunday" 11,152
Month of December, Heaviest Month 934,723
Total for the Year 9,676,926
THE ORANGE COUNTY TELEPHONE CO.
MIDDLETOWN, N. Y.

Envelope inserts may be used to effectively present information to subscribers. The Orange County Telephone Co. recently compiled traffic figures for 1938 and placed them in a form that attracted interest as well as making a real impression upon those seeing them.

in public what he has long felt in private that Dr. Jewett belongs to that very small group of leaders, statesmen and noblemen of science. Excerpts from the presentation address follow:

"The marvelous development of the art of electrical communications within our lifetime is in its major part the product of Dr. Jewett's work. After the loading coil came the vacuum tube amplifier and its uses in telephony, wireless and radio. These made possible the transcontinental telephone lines.

"Permalloy enormously improved submarine cable lines. Transoceanic telephone communication by radio was established in 1927. The automatic dial system was developed and introduced without confusion. Radio telephony, wire to wireless broadcasting, sound accompaniment to motion pictures, wire and wireless transmission of pictures and the teletypewriter are all his products now in wide use."

Other distinguished awards received previously by Dr. Jewett include the Edison, Faraday and Franklin medals. During the world war he helped to organize the National Research Council at the request of President Wilson. Serving as lieutenant colonel in the signal corps of the U. S. army, he had a prominent part in the establishment and maintenance of communications for the army and navy. For this service he was awarded a Distinguished Service medal.

Dr. Jewett has been with the Bell Telephone System since 1906; he has served as president of the Bell Telephone Laboratories Inc. and vice-president of the American Telephone & Telegraph Co. since 1925. Previously he taught school for a number of years, for a time serving as assistant to the late Dr. A. A. Michaelson, noted physicist of the University of Chicago. He is a former president of the A. I. E. E.

A three-way pass-box with light-tight doors renders a telephone accessible from two places outside the darkroom, as well as from the darkroom itself, without danger of admitting light into that sanctum while prints are being developed.

A Telephone Pass-Box For Camera Enthusiast

By Thomas Robert Edwards, Jr.

If you happen to be a confirmed camera addict, there is probably nothing more disturbing and annoying than to be called to the telephone when you are in the midst of developing films or prints at home. While your wife can handle social calls, some have to be answered by you—yet if you leave the darkroom the pictures will be ruined, either from light coming in as you open the door to go out, or from staying away too long.

Putting a special telephone in the darkroom is hardly justified, unless you are to use it a great deal. Then, too, another member of the family might want to use the telephone when he or she is in the basement and if the telephone is locked up in the darkroom with you, dispositions are apt to be upset.

A solution to this problem is offered in the accompanying photograph. The darkroom, on the right, is adjacent to a small laboratory on the left, the two being separated by a solid partition. Each room is reached by its own door from the basement passageway.

At the junction of the partition with the wall of the passageway, a three-way pass-box was installed at a convenient height for a person standing. Each opening is closed by a small light-tight door, painted dead black on the inside. On the outside, each is painted with aluminum paint, which is the standard color of the whole basement.

In operation, the telephone can be reached by opening the pass-box door in either the darkroom, the laboratory, or the passageway, with equal ease in each case. The instrument is handy if you are busy in the darkroom, and you don't have to leave your work to reach it. If anyone else wants to use it, he can do so without fear of sending a flood of light right over your pictures, with disastrous results.

It will also save you many a marathon race upstairs, only to find that the calling party had hung up, or that you talked too long with ruinous effects on the work in the darkroom.

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DO IT NOW!

Hundreds of telephone companies throughout the country are receiving Extra Revenue every month from their Gray Telephone Pay Stations.

This Extra Revenue that Gray Pay Stations can and will obtain for any telephone company is Proven over many years of service. No company is too small to benefit . . . and none too large. In fact, there is a GrayTelephone Pay Station made for any telephone company requirement.

Write the Gray Company today for assistance in making a pay station survey of your community and for complete facts about Extra Revenue.

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HARTFORD, CONN.

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AMERICAN AUTOMATIC ELECTRIC SALES CO., Chicago, Ill.
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KELLOGG SWITCHBOARD & SUPPLY CO., Chicago, Ill.
LEICH SALES CORPORATION, 222 W. Adams Street, Chicago, Ill.
STROMBERG-CARLSON TELEPHONE MFG. CO., Rochester, New York
CANADIAN TELEPHONES & SUPPLIES, LIMITED, Toronto, Montreal, Winnipeg and Vancouver
NORTHERN ELECTRIC CO., LTD., Halifax, Montreal, Toronto, Winnipeg, Regina, Calgary, Edmonton, Vancouver
Or any other telephone supply house

Financial News and Data

Recent Prices of Telephone Securities

(These nominal quotations, as of February 6, are furnished by W. C. Pitfield & Co. Inc., Commerce Building, Kansas City, Mo.)

TELEPHONE BONDS

	Bid	Asked
American Utilities Service Corp., 6s, 1964	75½	78
Ashland Home Telephone Co., 4½s, 1961	100	..
Associated Public Utilities Corp., 5s, 1947	68½	72½
Associated Telephone Co., Ltd., 4s, 1965	106½	108
Associated Telephone & Telegraph Co., 5½s, 1955	74	77
British Columbia Telephone Co., 5s, 1960	106½	..
California Water & Telephone Co., 5s, 1965	103	105
Central Electric & Telephone Co., 5s, 1955	101	102
Central Iowa Telephone Co., 5½s, 1947	99	..
Central Telephone Co. of Delaware, 6s, 1938	13	16
Citizens Independent Telephone Co., 4½s, 1961	103	104
Commonwealth Telephone Co. of Pennsylvania, 5½s, 1945	77	80
Commonwealth Telephone Co. of Wisconsin, 4s, 1966	103	105
Community Telephone Co., income 5s, 1949	8	10
Continental Telephone Co., 5s, 1953	96	98
Florida Telephone Corp., 6s, 1945	97	101
Florida Telephone Corp., 6s, 1954, second mortgage	68	73
Garv and Company, Theodore, 6% income notes, $5 par	3¾	4½
Home Telephone & Telegraph Co. of Fort Wayne, Ind., 5½s, 1955	103½	..
Home Telephone & Telegraph Co. of Fort Wayne, Ind., 6s, 1943	104½	..
Illinois Communities Telephone Co., 6s, 1949	53	57
Illinois Commercial Telephone Co., 5s, 1960	101	103
Illinois Commercial Telephone Co., 5s, 1948	102	104
Indiana Associated Telephone Co., 4½s, 1965	106	..
Indiana Central Telephone Co., 5½s, 1938	76	80
Inland Telephone Co., 6s, 1948	85	88
Interstate Telephone Co. of Idaho, 5s, 1961	103	104½
Interstate Telephone & Telegraph Co., 5½s, 1953	97½	99½
Investors Telephone Co., 3s, 1961	56	58
Iowa Illinois Telephone Co., 3s, 5½s, 1949	flat 35	38
Jamestown Telephone Corp., 5s, 1954	104	..
Keystone Telephone Co. of Philadelphia, 6s, 1951	97	100
Keystone Telephone Co. of Philadelphia, 5½s, 1955	93	96
La Crosse Telephone Co., 5½s, 1948	101	103
Lexington Telephone Co., 6s, 1944	100	101
Michigan Associated Telephone Co., 5s, 1961	105	..
Middlewestern Telephone Co., 6s, 1943	85	88
Missouri Telephone Co., 4½s, 1961	103	..
Ohio Associated Telephone Co., 4½s, 1966	104	..
Ohio Central Telephone Co., 6s, 1947	100	102
Pennsylvania Telephone Corp., 4s, 1965	106½	107½
Pike County Telephone Co. of Indiana, 6s, 1946	flat 50	..
San Angelo Telephone Co., 5s, 1958	102	..
Santa Barbara Telephone Co., 3½s, 1966	102	104
Southwestern Associated Telephone Co., 5s, 1961	102	105
Southwestern States Telephone Co., 6s, 1948	65	68
Southwestern States Telephone Co., 6s, 1949	60	63
Standard Public Service Co., 6s, 1948	57	60
Telephone Bond and Share Company, 5s, 1958	69½	72
Telephone Service Co. of Ohio, 5s, 1953	80	83
Tri-County Telephone Co., 4½s, 1956	103	..
United Telephone Co. of Delaware, 6s, 1948	85	88
United Telephone & Telegraph Co., 5½s, 1953	97½	100
United Telephone & Telegraph Co., 6s, 1953	99	101
Wabash Telephone Co., 4½s, 1956	103	..
West Coast Telephone Co., 5s, 1953	98	100
Western Light & Telephone Co., 5s, 1954	103	105

PREFERRED STOCKS

	Bid	Asked
Associated Telephone Co., Ltd., $1.25	24	26
Associated Telephone & Telegraph Co., 7% preferred	31	34
Associated Telephone & Telegraph Co., $6 first	30	33
Associated Telephone & Telegraph Co., $4 cumulative	6	8
Bell Telephone Co., of Penna., 6½%, $100 par	120	123
California Water & Telephone Co., 6%, $25 par	22	25
Central Electric & Telephone Co., $50 par	31	33
Community Telephone Co., $2 cumulative, no par	⅛	½
Commonwealth Telephone Co. of Wisconsin, 6%, $100 par	97	100
Continental Telephone Co., 7% first	75	80

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LEADS THE WAY!

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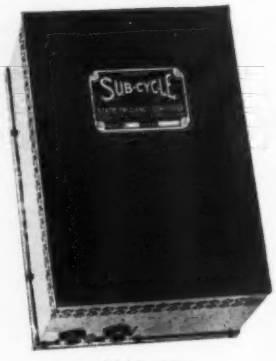
- WRITE FOR NEW BOOKLET



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608 S. Dearborn St. Chicago, Ill.
Wabash 8604

	Bid	Asked
Continental Telephone Co., 6½% first	70	75
Empire Telephone Co., 6% cumulative, Class "A," $25 par	13	17
Florida Telephone Corp., 6% cumulative, $100 par	38	..
Gary and Company, Theodore, first $1.60 pfd.	3¾	4½
General Telephone Allied Corp., 6% convertible	97	100
General Telephone Corp., $3 convertible	49	51
Home Telephone & Telegraph Co. of Fort Wayne, 7%, $50 par	51	..
Illinois Commercial Telephone Co., $6	61	65
Interstate Telephone & Telegraph Co., first, "A" 6%	47	50
Jamestown Telephone Corp., 5% cumulative, $100 par "A"	100	..
Jamestown Telephone Corp., participating pfd., $100 par	100	..
Keystone Telephone Corp., $4 cumulative, no par	3	6
La Crosse Telephone Co., 6% prior	96	100
Lexington Telephone Co., 6½% prior	37	41
Lincoln Telephone Co., 6% cumulative, $100 par	106	108
Loraine Telephone Co., 6% cumulative, $100 par	90	94
Middle States Telephone Co. of Illinois, 7%	90	94
Mount Vernon Telephone Co., 6% cumulative $100 par	89	92
Northern Ohio Telephone Co., 7% cumulative	100	..
Ohio Central Telephone Co., 7% first	50	55
Ohio Service Holding Corp., $5 pfd. $5 par	34	38
Pacific Telephone & Telegraph Co., 6% $100 par	144	146
Peninsular Telephone Co., 7% cumulative	110	..
Pennsylvania telephone corp., 6% cumulative	111	..
Rochester Telephone Corp., 6½% cumulative	113	115
The Southwestern Telephone Co. of Delaware, 7%	¼	..
Telephone Bond and Share Company, 7% first	19	21
Telephone Bond and Share Company, $3 first	10	..
Telephone Bond and Share Company, participating pfd.	4	..
Union Telephone Co., $1.70 pfd., $25 par	1½	..
Warren Ohio Telephone Co., 7%, $100 par	45	48
West Coast Telephone Co., 6%, $25 par	19	22
Western Light & Telephone Co., $1.75 first, $25 par	23½	25½
Wisconsin Telephone Co., 7%, $100 par	117½	..

COMMON STOCKS

American Telephone & Telegraph Co.	158	160
Associated Telephone & Telegraph Co., Class "A"	3	4
Bell Telephone Co. of Canada	165	170
Central Electric & Telephone Co.	⅞	1.00
Empire Telephone Co.	4	5
Florida Telephone Corp.	4	6
General Telephone Corp.	15	17
General Telephone Tri Corp.	25	28
Home Telephone & Telegraph Co. of Fort Wayne, $50 par	65	70
Illinois Bell Telephone Co.	150	155
International Telephone & Telegraph Corp.	9	11
Investors Telephone Co., $100 par	10	13
Lincoln Telephone & Telegraph Co., Class "A"	35	38
Middlewestern Telephone Co.	1	3
Mountain States Telephone & Telegraph Co.	123	125
New England Telephone & Telegraph Co.	107	110
Northern Ohio Telephone Co.	75	..
Peninsular Telephone Co.	26	30
Telephone Bond and Share Company, Class "A"	1½	2½
United Utilities, Inc.	2½	4
Western Light & Telephone Co.	¾	1.00

▼ ▼

Illinois Bell 1938 Net Income Down

There was a net gain of 33,920 in the number of telephones in service during 1938 by the Illinois Bell Telephone Co., according to its annual report to stockholders. This compares with an increase of 72,416 telephones in 1937 and 73,309 in 1936. The gain last year brought the number of telephones in operation to within 3.3 per cent of the record attained in 1930. At the end of last year telephones in service totaled 1,407,846.

Decrease in earnings of the company in 1938, President A. H. Mellinger stated, was caused by the decline in business activity in the early months of 1938 coupled with higher taxes and other costs. The company's business was adversely affected by the depression in the first half of the year. The recovery in the later months of 1938 was pronounced, he said.

The company's 1938 net income was $11,036,479, equal to $7.36 a share on the outstanding capital stock. Net income was $13,207,545, or $8.81 a share, in the preceding year. Dividends of $8 a share were paid, necessitating drawing on surplus to the amount of $963,521 to make the payments.

Taxes in 1938 cost the company $14,111,020, the highest in its history. This included social security taxes. The company's tax bill in 1937 was $12,933,970. The taxes amounted to $10.19 for each telephone in service.

Wages and salaries in 1938 totaled $41,950,000, compared with $40,770,000 in 1937.

Originating calls averaged 6,098,000 per day in 1938, an increase of 1 per cent over the 1937 average. The volume of local and long distance calls increased appreciably during the latter part of the year.

The company's business was aided, President Mellinger reported, by the growth in the southern Illinois oil industry. In 14 of the company's exchanges in the oil area 1,400 telephones were gained in 1938 compared with a normal gain of about 200. Toll business in the region increased about 60 per cent for the year and by December was 130 per cent above the same month in 1937.

Errors made in handling more than 6,000,000 calls daily averaged less than eight-tenths of 1 per cent. This is the best service record the company has ever attained, Mr. Mellinger said.

Aspects of the results of the year, in addition to the financial, which merit attention, President Mellinger stated, are:

"We continued to gain telephones, although the development was still below the maximum reached in 1930.

"The quality of our service equalled, and in some respects bettered, the best records of previous years.

"Our average rates were the lowest

The **NEW BATTERY**
to meet today's telephone demands

Season after season, month after month, long after the time you expect ordinary telephone batteries to signal feebly for replacement, Ray-O-Vacs carry on, full-powered and hearty. They cost no more---but how they cut down replacement costs.

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Where you need an unprotected cable terminal for 6 pair or less, specify the Cook X6B, the terminal preferred for its light, compact construction, its protection against weather, condensation, dirt and insects, its long life and dependable service.

TERMINAL AND PROTECTION EQUIPMENT

COOK

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Have You Read

The Michigan P.S.C. ruling: "All conductors and equipment of electrical supply and communication lines . . . shall be so . . . marked or numbered as to facilitate identification . . . with its name, initials or corporate symbol or other distinguishing mark . . ."

Similar rules have been issued by over 15 states and the Dominion of Canada. How are you going to comply with them?

Cost sheets prove that the first cost of installing Premax Metal Letters, Figures and Pole Markers is less than stenciling—and there is no upkeep as Premax Products endure as long as the poles. Get complete information on this improved modern method today—it will lower your costs.

Send for Samples.

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in effect for many years, with the customer receiving more for his money than ever before in actual or potential telephone service.

"Our employes were receiving the highest average wage ever paid by the company."

Gross additions to plant during the year amounted to $17,924,047, compared with $20,506,811 in 1937. Manual common battery equipment replaced the magneto type in seven exchanges. Dial equipment, replacing magneto type, was placed in service in 30 small offices either in existing company-owned buildings or in rented quarters built or prepared especially for the company's use.

Local service revenues were $66,111,445 in 1938 compared with $66,119,348 in 1937. Toll revenues amounted to $19,083,887 as against $19,648,680 in 1937. Total operating revenue was $87,186,670 compared with $87,677,540.

Current maintenance was $17,153,372 in 1938 and $16,675,267 in 1937. Traffic expenses amounted to $16,646,895 as against $16,389,870 in 1937. Commercial expenses were $7,632,793 as compared with $7,145,341 in 1937. Total operating expenses were $60,231,867 in 1938 and $59,457,624 in 1937. Net operating revenues in 1938 amounted to $26,954,803 as against $28,032,215 in 1937.

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Annual Report of Carolina Company, Tarboro, N. C.

The annual report of the Carolina Telephone & Telegraph Co., of Tarboro, N. C., made public recently, was the first report submitted to the stockholders by J. R. Porter, as president of the company. It was at the specific recommendation last year of the encumbent president, Geo. A. Holderness, that Mr. Porter was elevated from his position of executive vice-president to that of president of the Carolina company, and Mr. Holderness became chairman of the board. Mr. Holderness, at the time, stated that he recommended the change to "bestow upon a faithful officer an honor which I think he deserves and one which he should not have to wait for until I am incapacitated or dead."

The annual report of the Carolina company for the year ended December 31, 1938, as presented by President Porter, shows a gain of 1,943 stations for the year, bringing the total up to 33,130. A total of 1,904,088 long distance calls were reported for the year, a gain of 46,023 over the total for 1937. The gains during 1938, although substantial, were not comparable with those for 1937.

The president reported that during the past several years efforts were put forward to develop the rural areas. At the end of 1938 the company had company-owned and maintained lines serving 2,209 rural subscribers. In addition, switching service was given to farmer-owned and maintained lines serving 826 farmers. This made a total of 3,035 rural subscribers, an increase of 200 during the past year.

Operating revenues for 1938 totaled $1,595,724, as compared with $1,526,014 in 1937. Operating expenses totaled $989,209 in 1938 as compared with $903,852. Taxes applicable to 1938 were $282,962. The total taxes paid and accrued in 1938 amounted to $285,721, representing 17.91 cents out of every dollar of revenue collected.

After deducting taxes from net operating revenues and adding non-operating revenues, total net earnings for 1938 were $331,728, as compared with $363,724 in 1937. After interest deductions the net income was $315,857 in 1938 and $356,009 in 1937. After dividend payments of $272,000 in both years, the balance to surplus was $43,857 in 1938 and $84,009 in 1937.

The company's assets at the close of 1938, totaling $6,363,558, included physical property with a book value of $6,092,659. At the close of 1937 the assets totaled $6,192,919.

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Pennsylvania Telephone Corp. Plans Preferred Stock Issue

The Pennsylvania Telephone Corp., Erie, Pa., has filed a registration statement under the terms of the Securities Act of 1933 to cover the issue of 24,000 shares of $2.50 cumulative preferred capital stock. The price to the public and the underwriting commissions are to be stated later by amendment.

Proceeds from the sale of this stock, with the proceeds from the sale to General Telephone Corp., the company's parent concern, of 3,000 shares of common stock at $50 a share, and with treasury funds will be used to pay $1,350,000 of 5 per cent notes owed to General Telephone.

This indebtedness was incurred last year when the company bought property of the Bell Telephone Co. of Pennsylvania in Johnstown, Pa., and five neighboring communities, and made additions and betterments to its plant.

The underwriters and the amount taken by each of the firms are: Bonbright & Co., 12,000 shares; Paine, Webber & Co., 9,000; Mitchum, Tully & Co., 3,000. The new preferred will be redeemable at $54.50 a share and accrued dividends.

Commission and Court Activities

Approval Withheld on Appropriation for FCC

The House appropriations committee on February 6 in acting upon appropriations to operate independent government agencies for the year starting July 1, withheld approval of the $2,038,175 appropriation recommended for the Federal Communications Commission. This was done pending action by Congress on the President's request for reorganization of the commission.

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Ohio Association's Wage-Hour Petition

The Ohio Independent Telephone Association through its board of directors has petitioned the national Congress to amend the federal wage-hour law of 1938 so as to clarify the present exemption clause which is interpreted by the board as applying to small Independent telephone exchanges doing a predominantly intrastate business.

Congress is also asked to provide within such amendment, in clear and unmistakable language, for the exemption from the federal wage-hour law of Independent telephone exchanges doing a predominantly intrastate business and serving 2500 or less subscribers.

The association sets forth in its petition that unless the amendments sought are passed it will result in the complete abandonment of service at many points. Further, it will result in the reduction of the present 24-hour service being rendered rural and village communities to a part-time basis, probably as few as eight hours at numerous places; and that it will mean the permanent abolishment of existing jobs through forced consolidation, elimination and mechanization of small exchanges.

The association has urged all of its member companies to advise their senators and representatives in Congress of their plight and to urge support of amendments to the law that will afford the necessary relief.

▼ ▼

Wage-Hour Conference Held in Oklahoma

About 20 leaders of the Oklahoma Telephone Association held a conference January 27 with members of the Oklahoma Corporation Commission and explained the disastrous effects of the federal wage-hour law if it should be applied to small telephone companies in Oklahoma.

Present at the meeting were Commissioners A. S. J. Shaw and Ray Weems, B. Richardson, telephone engineer of the commission, and L. V. Reid, general counsel of that body.

H. W. Hubenthal, secretary of the Oklahoma association, explained the wage-and-hour schedules provided in the law. He then cited figures to show that the expenses of small telephone companies would be greatly increased with the result that they would be forced to give only eight to ten hours' service, instead of 24 hours as at present, install automatic equipment which might result in abolishment of jobs for 1200 to 1500 persons, greatly aggravating the unemployment situation in the state, or be forced to abandon service entirely.

There are 265 Independent telephone companies in Oklahoma, operating 410 exchanges with 60,000 subscribers, serving about one-fourth the population of Oklahoma and employing about 1500 operators, linemen and other workers, Mr. Hubenthal stated. He declared that telephone people of Oklahoma are worried over the uncertainty arising from conflicting statements as to whether or not the law applies to them and the dangers if it finally should be established that they are under the law.

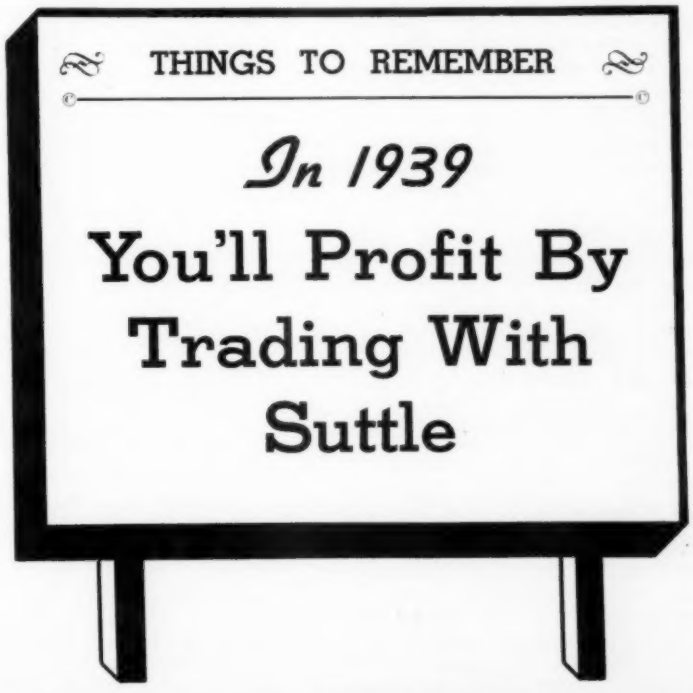
Mr. Hubenthal cited figures based on a study of 100 telephone exchanges in Oklahoma, indicating that compliance with the federal wage-hour act would impose the following additional burdens on the average exchange:

Under the 25 cents per hour, 44 work hours per week schedule, the average increased cost per subscriber (including switched subscribers) would be $5.00 per year, or 41 cents per month to meet increased payrolls.

Under the 30 cents per hour, 42 work hours per week schedule, the average increased cost per subscriber (including switched subscribers) would be $8.34 per year, or 69 cents per month.

Under the 40 cents per hour, 40 work hours per week schedule, the average increased cost per subscriber (including switched subscribers) would be $15.00 per year or $1.25 per month.

Based on his study of 100 exchanges, Mr. Hubenthal estimated that increased



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cost of meeting the payrolls under the law would aggregate $298,264 per year on 400 exchanges on the first step. On the final step additional cost would be approximately $900,000 per year.

This latter figure, Mr. Hubenthal explained to the commission, far exceeds the total net income that these 400 exchanges could possibly produce under present rates or that they could produce under any schedule of telephone rates that subscribers would pay.

Extra Handset Charge Removed in Four States

The Federal Communications Commission has made public a chart showing changes in the charges made for telephone handsets since January 1, 1938. The data for the report were furnished by the American Telephone & Telegraph Co. in response to an informal request by the commission.

The chart shows that telephone subscribers in 26 states pay an extra charge for the use of handsets. These charges range from 15 cents per month for 24 months, and then a charge of 5 cents per month to run indefinitely, as in Florida, to 10 cents per month for 12 months, as in California and Oregon.

Wisconsin is the only state in which the charge continues indefinitely from the time the handset is first installed. It is eight cents per month. Louisiana has the highest charge of any state, the rate being 25 cents per month for 18 months.

The average fee charged in these 26 states which still permit a special rate for handset service, is 15 cents per month for 18 months. Subscribers in Georgia, Kentucky, Montana, Nevada, North Carolina, Ohio, Oklahoma, South Carolina and Washington pay that amount for handsets. In Alabama, Arkansas, Indiana, Kansas, Minnesota, and Mississippi, the 15-cent charge continues for 24 months.

The chart shows that during the past year the extra charge was removed in Arizona, Colorado, New Mexico and Wyoming.

Extra Charge for Handsets in Wisconsin

Abolition of the 8-cent monthly charge for handset telephone service in Wisconsin would interfere with general rate reductions involved in the case pending before the state supreme court, the Wisconsin Public Service Commission explained February 6.

The Bell System, the commission pointed out, has agreed to removal of the charge in many states, but not in Wisconsin because of the pending rate case. Other telephone companies in the state either make the eight-cent charge, or add 25 cents a month on bills, for two years.

Answers to Traffic Questions on Page 25

1. Thirty seconds from the time you have passed the request or the distant operator said, "I will give you TX," if you have received no answer, again reach the distant operator and say AG TX."
2. The first call is canceled and is subject to a report charge. A new ticket is made on the second call.
3. No. Operators meeting on a circuit should challenge for it in the prescribed manner. The operator handling the call having precedence should be permitted to use the circuit.
4. If you do not immediately proceed with the attempt to complete the call, or if you release the calling party as, for example, when "ag (time)" appears in the "Special Instruction" space, the filing time is entered in the "Filing Time" space.
5. "MX" means "multi-switch," a term used for designating a long distance call handled over a connection built up through more than one office by means of ringdown toll circuits and ringdown trunks or ringdown toll circuits alone.

Court Considers Appeal in Illinois Bell Refund Case

The United States Circuit Court of Appeals recently took under advisement the appeal of the state of Illinois to reverse a district court decision which authorized the Illinois Bell Telephone Co. to retain approximately $1,600,000 in uncollected refunds in the company's subscriber refund case.

Summary of Commission Rulings and Hearings

Federal Communications Commission Washington, D. C.

January 24: The Indiana Telephone Corp., of Indianapolis, was granted classification as a connecting carrier, subject only to the provisions of Sections 201-205 of the Communications Act, inclusive, in connection with the conduct of its telegraph operations. The company has already been classified as a connecting carrier with respect to its telephone business.

January 24: Authority granted Walter L. Prehn to hold positions as director and vice-president of the Del Rio & Winter Garden Telephone Co. and director of the San Angelo Telephone Co., under Section 212 of the Communications Act of 1934.

January 30: New Jersey Bell Telephone Co. was granted authority to supplement existing facilities between Bordentown and Burlington, N. J.

February 10: Hearing in the acquisition by the Wisconsin Telephone Co. of telephone properties of Edwin G. Beardmore of Oshkosh, known as the Winnebago County Telephone Co.

Missouri Public Service Commission

February 1: Joint application filed by C. L. Schieferdecker for permission to sell and R. B. Parker to purchase the Newark Telephone Exchange and property located in Newark.

Nebraska State Railway Commission

February 1: In the matter of the application of the Ames Creek Telephone Co., of Obert, for authority to reduce residence rates from $1.50 a month to $1.25 and to reduce rural rates from $1.25 to $1.00 a month; being in the nature of a reduction no necessity exists for a hearing so application was granted as asked.

February 1: Approval granted application of the Lincoln Telephone & Telegraph Co. for authority to change classification of service at its exchanges at Benedict and Steele City and to reclassify service and rates at its exchanges at Ohiowa, Waco, Bradshaw and Surprise.

February 1: In the matter of the application of the Farmers Telephone Co. of Dodge County, with headquarters at North Bend, for authority to establish standard toll rates between its five exchanges; it appearing that the construction of numerous rural power lines in the territory served will necessitate the metallicizing of many of the company's rural lines and that the company desires to abolish free toll service between the exchanges in preference to asking for an increase of exchange rates in order to finance new construction necessary, found to be reasonable and granted as asked subject to the filing of complaints by March 1.

February 2: Application filed by the Farmers Mutual Telephone Co., of Avoca, asking authority to increase farm rates (switching service) from 50 to 60 cents a month; residence from 70 to 85 cents, and business from $1.05 to $1.25.

February 2: Application filed by the Ponca Telephone Co., of Ponca, asking for an increase of 50 cents a month on the present schedule of $1.50 for business, $1.00 for residence and 25 cents for switching, in order to meet operating expenses.

February 3: Application filed by the Northeastern Telephone Co., of Walthill, for an increase of 25 cents a month on rural rates of $1.50 a month at its Walthill, Winnebago and Rosalie exchanges, to meet the expense of metallicizing lines caused by construction of county rural public power project.

February 23: Hearing in Lincoln on

application of the Lincoln Telephone & Telegraph Co. for authority to close its exchange at Juniata, Adams county.

New York Public Service Commission

February 2: Petition for rehearing denied Cassie Richardson who operates a small telephone system in the town of Macomb, St. Lawrence County. She asked for a rehearing in a proceeding in which the Macomb Telephone Co., Inc., was given permission to construct and operate a telephone line over a certain route in Macomb.

The commission held that the petition for rehearing disclosed no persuasive reasons why the conclusions previously reached should be changed and that sufficient grounds for a rehearing on the prior order had not been made to appear.

North Dakota Board of Railroad Commissioners

January 15: Approval granted sale of the Central West Co.'s telephone properties in Forest River to Mrs. Rogna Legge, in whose home the exchange has been operated.

Ohio Public Utilities Commission

January 31: The secretary of the commission certified his report recommending that the application of the Ohio Bell Telephone Co. be granted to increase rentals in the following exchanges:

Salineville, Fletcher-Lena, West Lafayette, Conesville, Chesterland, Bloomingdale, Castalia, and Christianburg.

The report stated that at the instance of local subscribers, who have agreed to the proposed rates, the company will change local operation in the several exchanges from magneto to automatic service. The secretary in his report recommended that increased rates be made effective on completion of the new automatic dial system.

Thirty days will be allowed for the filing of possible objections to the proposed increased rates.

January 31: Upon showing that all subscribers in the Put-in-Bay exchange are now using dial service, the commission authorized the Northern Ohio Telephone Co., of Bellevue, to cancel its rates for magneto service.

The company was also authorized to amend summer season rates to regular rates to provide that such service retained for longer than the minimum period of six months be charged for at the regular rate for the class of service used.

February 2: The Ohio Bell Telephone Co. was authorized to amend its toll route guide to show that Northfield, where the Western Reserve Telephone Co. operates, has been made a rate center and Macedonia a subscriber station.

February 2: Authority granted the Ohio Bell Telephone Co. to revise its base rate area at West Jefferson to add certain territory that is developing and to eliminate other territory in which there has been no development.

February 2: Setting forth that 240 of the present subscribers of the Burton exchange in Geauga county have agreed to new rates for improved service, the Ohio Bell Telephone Co. petitioned for authority to revise rates upon conversion of its magneto plant to an automatic common battery plant.

February 3: Authority granted the newly-created Fulton Telephone Co., of Lima, to issue to the subscribers of its initial paid-in capital 10 shares of no-par common stock at a stated value of $63.20 per share.

February 15: Hearing to be held on the application of the Ohio Associated Telephone Co. to increase rates at Lower Salem, the statutory period for objections to the report certified December 30 having expired without any being filed.

February 20: Hearing on application of the Webster Telephone Co., of Luckey, to increase rates.

Oklahoma Corporation Commission

February 9: Hearing on application of the Southwest Telephone Co. for authority to change equipment and reclassify service at its Texola exchange.

February 16: Hearing on application of Southwestern States Telephone Co. for authority to change from magneto to dial selective ringing type of service in its exchange at Asher.

Pennsylvania Public Utility Commission

January 24: Order issued postponing for six months establishment of new rates for "foreign exchange" service of Bell Telephone Co. of Pennsylvania which were scheduled to become effective February 1.

February 2: Hearing resumed in Philadelphia on proposed changes by Bell Telephone Co. of Pennsylvania in its rates for foreign exchange and limited service.

Wisconsin Public Service Commission

February 1: Hearing at Alma on application of the Nelson Telephone Co. for authority to increase its rates.

February 8: Hearing in Eau Claire in the commission's investigation of the necessity of the extension of the lines of the Wisconsin Telephone Co. on its Chippewa Falls exchange to the generating plant of the Wisconsin Power Cooperative in the town of Eagle Point, Chippewa county.

February 9: Rehearing in Madison in the commission's investigation of the rules for extension of service and line facilities at exchanges of the Commonwealth Telephone Co.

February 10: Hearing in Menomonie on application of the Community Telephone Co. of Wisconsin for authority to increase rates at Prescott, Wheeler, Boyceville, Knapp (further hearing), Glenwood City, Elk Mound and Colfax.

February 10: Hearing in Madison on application of the Belmont & Pleasant View Telephone Co. for authority to issue $3,750 of common stock and acquire property of the Iowa & Lafayette County Telephone Co.

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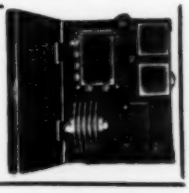
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